DIAMOND MICROELECTRODES FOR THE *IN VITRO* MEASUREMENT OF NOREPINEPHRINE RELEASE FROM SYMPATHETIC NERVES IN RATS

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Abstract

Polycrystalline boron-doped diamond microelectrode is an advanced electrode material that possesses attractive properties for electroanalytical measurements in biological environments (e.g., low limit of detection, response precision, wide working potential window, and pH independence). The diamond surface is non-polar with a low surface oxygen content and this results in weak adsorption of polar molecules and contaminants. Therefore, the response stability and fouling resistance of diamond are superior to that of carbon fiber microelectrode - a common electrode material used for the electrochemical detection of catecholamine neurotransmitters.

Norepinephrine (NE) is the primary neurotransmitter in the sympathetic nervous system and controls vasomotor tone. We report presently on the use of diamond microelectrodes and video imaging techniques to monitor local NE release and mesenteric arterial constriction using *in vitro* preparations from laboratory test rats. NE release was elicited by focal electrical stimulation (1-20 Hz) of periarterial nerves. The diamond response sensitivity and stability for this *in vitro* measurement will be compared with that of a carbon fiber. Data will also be presented showing the correlation of NE release with vasoconstriction.